

Customer No.: 31561
Application No.: 10/065,091
Docket No.: 5486-US-PA

To the Claims:

Claim 1. (currently amended) A liquid crystal display (LCD) structure, comprising a first substrate panel, a second substrate panel, and a liquid crystal layer disposed between the first substrate panel and the second substrate panel, a plurality of pixel portions being formed by respective electrodes for applying a voltage to the liquid crystal layer, each of the pixel portions comprising

an organic insulating layer over the first substrate panel, wherein the surface of the organic insulating layer has a plurality of protrude/recess structures thereon;

a conformal reflective layer over the organic insulating layer, wherein the conformal reflective layer serves as a reflector of light;

a transparent dielectric layer over the conformal reflective layer, wherein the dielectric layer has a smoother upper surface than the bumpy organic insulating layer; and

a first transparent conductive layer over the transparent dielectric layer, wherein the conformal reflective layer is electrically isolated from the first transparent conductive layer.

Claim 2. (original) The LCD structure of claim 1, wherein the first substrate panel includes a glass panel.

Claim 3. (original) The LCD structure of claim 1, wherein the material forming the organic insulating layer includes an acrylic resin.

Claim 4. (original) The LCD structure of claim 1, wherein the material forming the organic insulating layer includes a photosensitive resin.

Claim 5. (original) The LCD structure of claim 1, wherein the first substrate panel

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further includes a thin film transistor having a gate electrode, a source terminal and a drain terminal over the first substrate panel.

Claim 6. (original) The LCD structure of claim 5, wherein the first transparent conductive layer is connected to the thin film transistor for controlling the liquid crystal layer.

Claim 7. (original) The LCD structure of claim 1, wherein the material forming the conformal reflective layer includes aluminum or silver or a reflective non-conducting material.

Claim 8. (previously presented) The LCD structure of claim 1, wherein the transparent dielectric layer includes a color filter layer.

Claim 9. (previously presented) The LCD structure of claim 1, wherein the transparent dielectric layer includes a transparent insulating material layer.

Claim 10. (original) The LCD structure of claim 1, wherein the LCD further includes:

- a second substrate that is aligned to the first substrate panel;
- a second transparent conductive layer over the second substrate panel; and
- a liquid crystal layer between the second transparent conductive layer and the first transparent conductive layer.

Claim 11. (original) The LCD structure of claim 10, wherein the surface of the second substrate panel on the opposite side of the liquid crystal layer further includes a phase compensation plate and a polarizer.

Claim 12. (previously presented) The LCD structure of claim 10, wherein the

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transparent dielectric layer includes a transparent insulating material layer.

Claim 13. (original) The LCD structure of claim 12, wherein the LCD further includes a color filter layer between the second substrate panel and the second transparent conductive layer.

Claim 14-23 (cancelled)

Claim 24. (withdrawn) A liquid crystal display (LCD) structure, comprising:
a first substrate panel with a plurality of pixel portions being formed by respective electrodes for applying a voltage to the liquid crystal layer, each of the pixel portions comprising:

an organic insulating layer over the first substrate panel, wherein the surface of the organic insulating layer has a plurality of protrude/recess structures or bumps;

a plurality of reflectors over the organic insulating layer such that portions of the organic insulating layer are exposed, wherein the reflectors exposes about 1 to 60% of the overall organic insulating layer area, the reflectors form a reflector of light and the exposed organic insulating areas form the transmission areas, and the reflectors and the exposed organic insulating areas are alternately laid with respect to each other;

a dielectric layer over the reflectors and the exposed organic insulating areas, wherein the upper surface of the dielectric layer is smoother than the protrude/recess structure of the organic insulating layer; and a first transparent conductive layer over the dielectric layer.

Claim 25. (withdrawn) The LCD structure of claim 24, wherein each protrude/recess structure may be divided into a first region and a second region depending

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on the viewing angle according to the following relationship:

assuming a beam of incoming light strikes a surface having protrude/recess structures covered by a reflective layer entirely and produces reflected lights, if the reflected lights distribute within a preferable observation range, the region in the protrude/recess structure that corresponds to such a range is defined to be the first region serving as the reflectors region, and if the reflected light spreads outside the preferable observation range, the region in the protrude/recess structure that correspond to such difficult-to-see range is defined to be the second region where the reflectors are removed, and the exposed transmission areas are in the second region.

Claim 26. (withdrawn) The LCD structure of claim 24, wherein the LCD further includes a thin film transistor having a gate electrode, a source terminal and a drain terminal over the first substrate panel.

Claim 27. (withdrawn) The LCD structure of claim 24, wherein the dielectric layer includes a color filter layer.

Claim 28. (withdrawn) The LCD structure of claim 24, wherein the dielectric layer includes a transparent insulating material layer.

Claim 29. (withdrawn) The LCD structure of claim 24, wherein the LCD further includes:

- a second substrate panel corresponding to the first substrate panel;
- a second transparent conductive layer over the second substrate panel; and
- a liquid crystal layer between the second transparent conductive layer and the first transparent conductive layer.

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Claim 30. (withdrawn) The LCD structure of claim 29, wherein the LCD further includes a phase compensation plate and a polarizer on each exterior-facing side of the first substrate panel and the second substrate panel away from the liquid crystal layer.

Claim 31. (withdrawn) The LCD structure of claim 29, wherein the dielectric layer includes a transparent insulating material layer.

Claim 32. (withdrawn) The LCD structure of claim 31, wherein the LCD further includes a color filter layer between the second substrate panel and the second transparent conductive layer.

Claim 33. (withdrawn) The LCD structure of claim 29, wherein the LCD further includes a back lighting system attached to the side of the first substrate panel on the other side of the second substrate panel such that a portion of the emitted light from the back lighting system passes through the transmission electrode, and the remaining portion of the emitted light reflects back from the reflective electrode and reused.

Claim 34-43 (cancelled)

Claim 44. (withdrawn) A liquid crystal display (LCD) structure, comprising a first substrate panel, a second substrate panel, and a liquid crystal layer disposed between the first substrate panel and the second substrate panel, a plurality of pixel portions being formed by respective electrodes for applying a voltage to the liquid crystal layer, each of the pixel portions comprising

an organic insulating layer over the first substrate panel, wherein the surface of the organic insulating layer has a plurality of protrude/recess structures thereon;

a conformal reflective layer over the organic insulating layer, wherein the

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conformal reflective layer serves as a reflector of light;

a transparent dielectric layer over the conformal reflective layer, wherein the dielectric layer has a smoother upper surface than the bumpy organic insulating layer;

a first transparent conductive layer over the transparent dielectric layer; and

a liquid crystal alignment layer located between the first transparent conductive layer and the liquid crystal layer.

Claim 45. (withdrawn) The LCD structure of claim 44, wherein the material forming the organic insulating layer includes an acrylic resin.

Claim 46. (withdrawn) The LCD structure of claim 44, wherein the material forming the organic insulating layer includes a photosensitive resin.

Claim 47. (withdrawn) The LCD structure of claim 44, wherein the first substrate panel further includes a thin film transistor having a gate electrode, a source terminal and a drain terminal over the first substrate panel.

Claim 48. (withdrawn) The LCD structure of claim 47, wherein the first transparent conductive layer is connected to the thin film transistor for controlling the liquid crystal layer.

Claim 49. (withdrawn) The LCD structure of claim 44, wherein the material forming the conformal reflective layer includes aluminum or silver or a reflective non-conducting material.

Claim 50. (withdrawn) The LCD structure of claim 44, wherein the transparent dielectric layer includes a color filter layer.

Claim 51. (withdrawn) The LCD structure of claim 44, wherein the transparent

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dielectric layer includes a transparent insulating material layer.

Claim 52. (withdrawn) The LCD structure of claim 44, wherein the LCD further includes:

- a second substrate that is aligned to the first substrate panel;
- a second transparent conductive layer over the second substrate panel; and
- a liquid crystal layer between the second transparent conductive layer and the first transparent conductive layer.

Claim 53. (withdrawn) The LCD structure of claim 52, wherein the surface of the second substrate panel on the opposite side of the liquid crystal layer further includes a phase compensation plate and a polarizer.

Claim 54. (withdrawn) The LCD structure of claim 52, wherein the transparent dielectric layer includes a transparent insulating material layer.

Claim 55. (withdrawn) The LCD structure of claim 54, wherein the LCD further includes a color filter layer between the second substrate panel and the second transparent conductive layer.

Claim 56. (currently amended) A liquid crystal display (LCD) structure, comprising a first substrate panel, a second substrate panel, and a liquid crystal layer disposed between the first substrate panel and the second substrate panel, a plurality of pixel portions being formed by respective electrodes for applying a voltage to the liquid crystal layer, each of the pixel portions comprising

an organic insulating layer over the first substrate panel, wherein the surface of the organic insulating layer has a plurality of protrude/recess structures thereon;

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a conformal reflective layer over the organic insulating layer, wherein the conformal reflective layer serves as a reflector of light;

a transparent dielectric layer over the conformal reflective layer, wherein the transparent dielectric layer has a substantially planar upper surface; and

a first transparent conductive layer over the transparent dielectric layer, wherein the conformal reflective layer is electrically isolated from the first transparent conductive layer.

Claim 57. (previously presented) The LCD structure of claim 56, wherein the material forming the organic insulating layer includes an acrylic resin.

Claim 58. (previously presented) The LCD structure of claim 56, wherein the material forming the organic insulating layer includes a photosensitive resin.

Claim 59. (previously presented) The LCD structure of claim 56, wherein the first substrate panel further includes a thin film transistor having a gate electrode, a source terminal and a drain terminal over the first substrate panel, and the first transparent conductive layer is connected to the thin film transistor for controlling the liquid crystal layer.

Claim 60. (previously presented) The LCD structure of claim 56, wherein the transparent dielectric layer includes a color filter layer.

Claim 61. (previously presented) The LCD structure of claim 56, wherein the transparent dielectric layer includes a transparent insulating material layer.